



Armed Forces College of Medicine AFCM





Autonomic nerves of thorax

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INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture the student will be able to:

1. Describe the course and distribution of the vagus and thoracic part of sympathetic chain.
2. Discuss the formation and distribution of autonomic plexuses of thorax (cardiac and pulmonary).

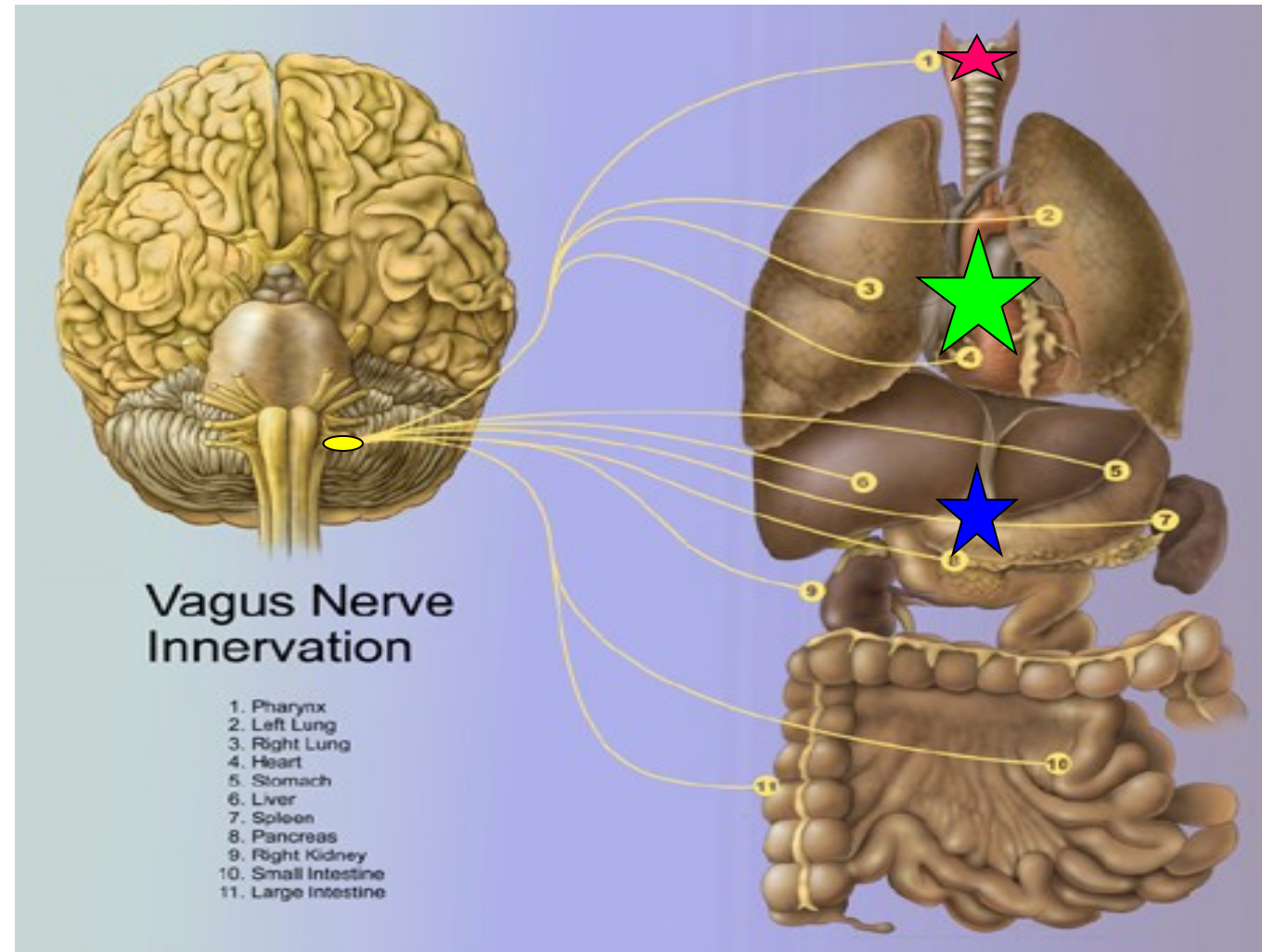


VAGI IN THE THORAX



The Vagi

- Vagus is the 10th cranial nerve
- **Origin** : from **medulla oblongata**
- **Course** : has a long course in the **neck**, **thorax** & **abdomen**
- Only the **thoracic part** of the vagus is described here

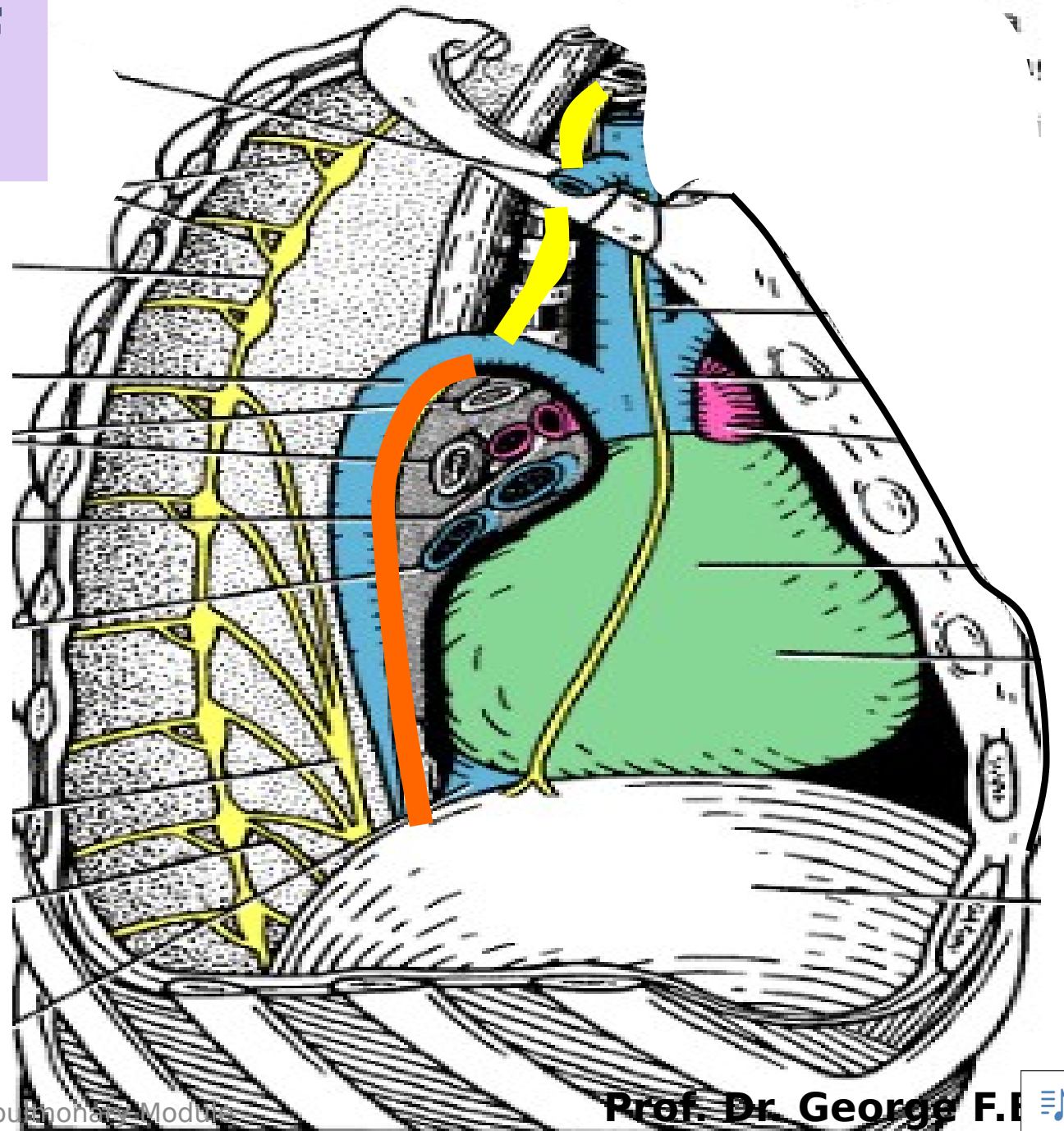


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Course & relations of vagus nerve

- Vagus nerve descends first in the **superior mediastinum** → then in the **posterior mediastinum**

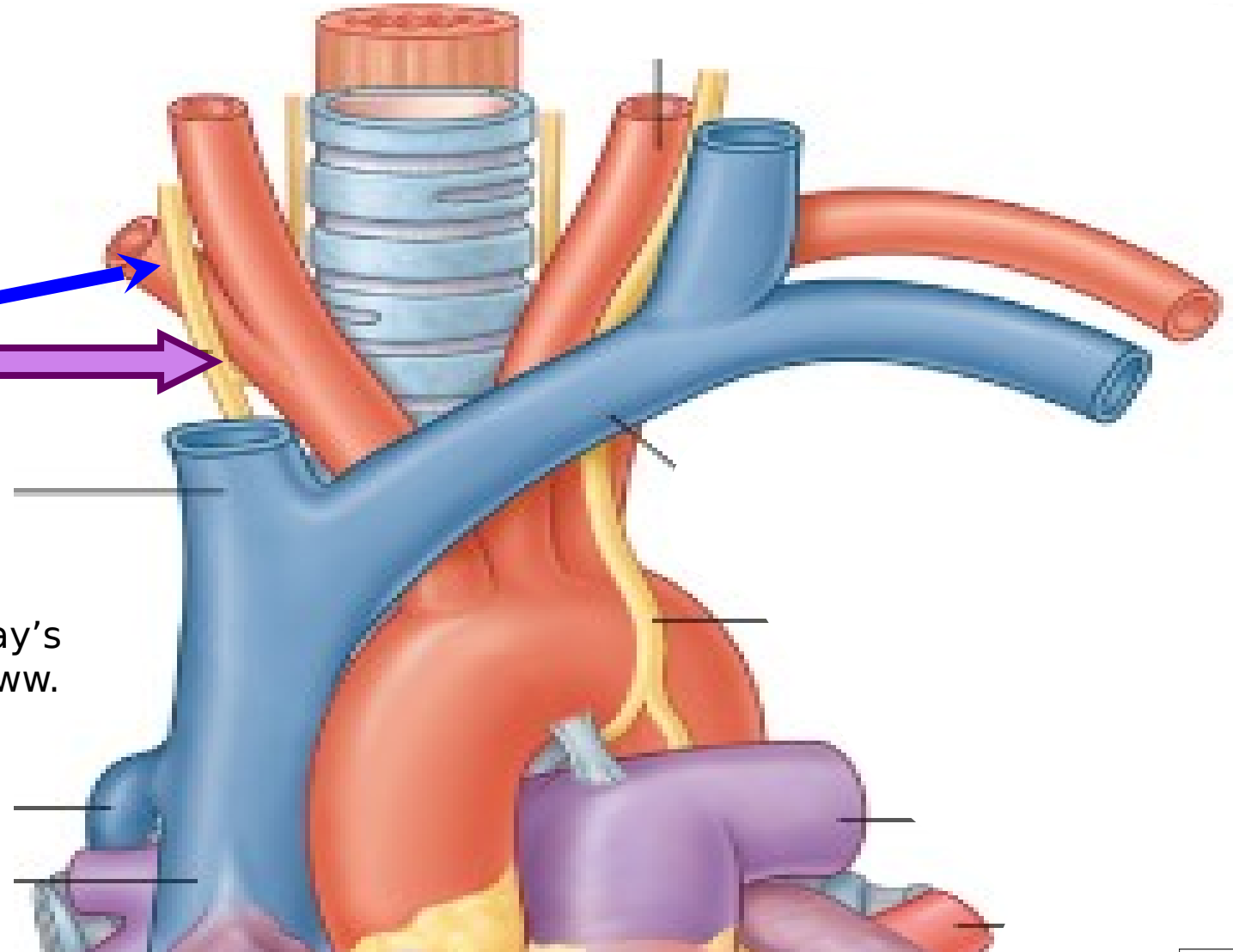
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Course & relations of vagus nerve

- The right vagus

Enters the thorax by
crossing in front of the
subclavian artery



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Course of right vagus (cont)

- Right vagus descends behind **right brachiocephalic vein**
- Above root of Rt. Lung, \square descends on left side of **arch of azygos**
- Behind right bronchus *where it forms* **right post. pulmonary plexus**
- Behind **esophagus** *where it forms* **esophageal plexus**
- Passes through **esophageal opening** in **diaphragm** \square **post.** to the stomach, *therefore called* **posterior gastric nerve**



Rt brachiocephalic vein

Right vagus

Rt Post Pulmonary plexus

Arch of azygos

Br

esophagus

Esophageal plexus

Esophageal opening

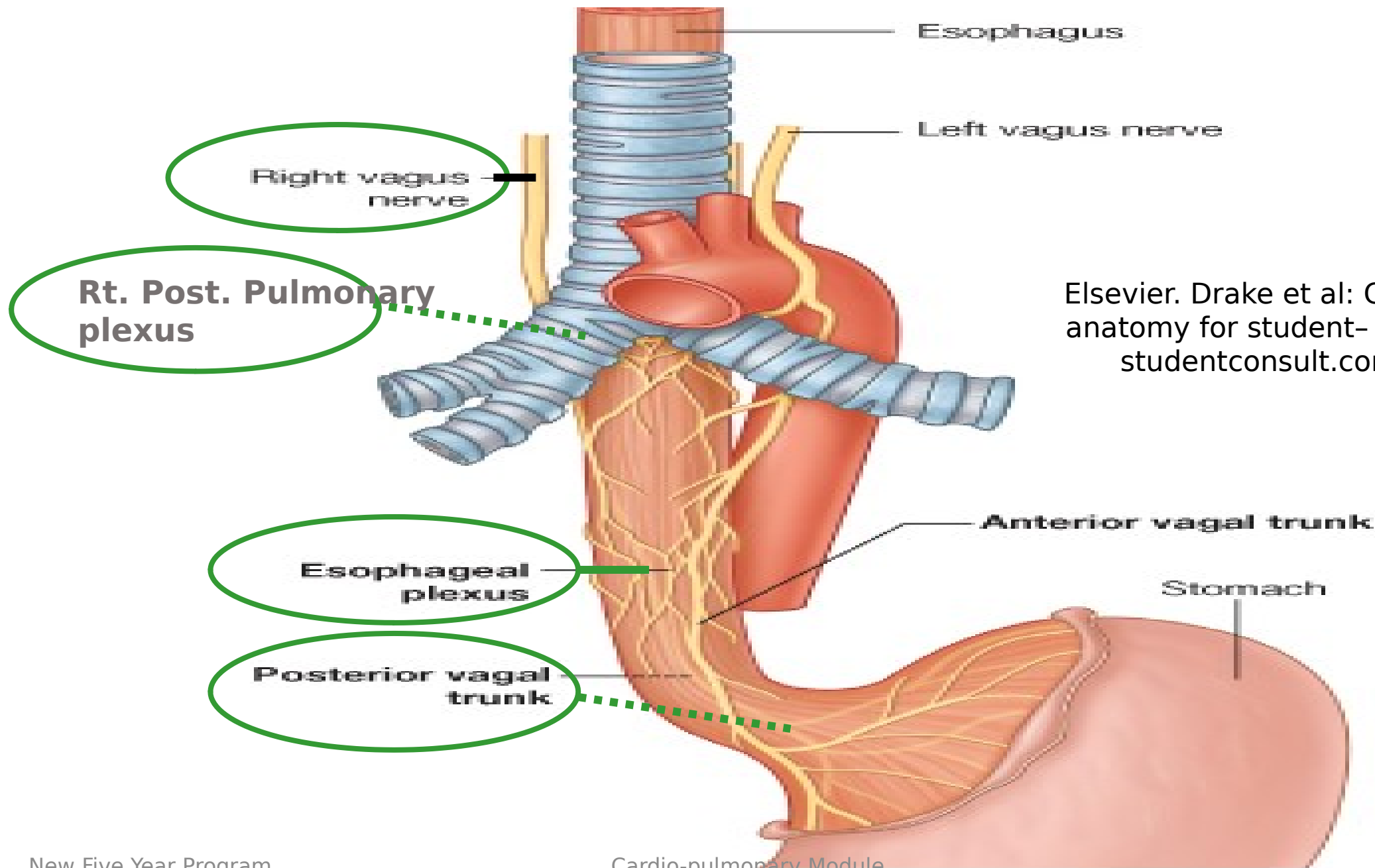
diaphragm

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Post. Gastric n

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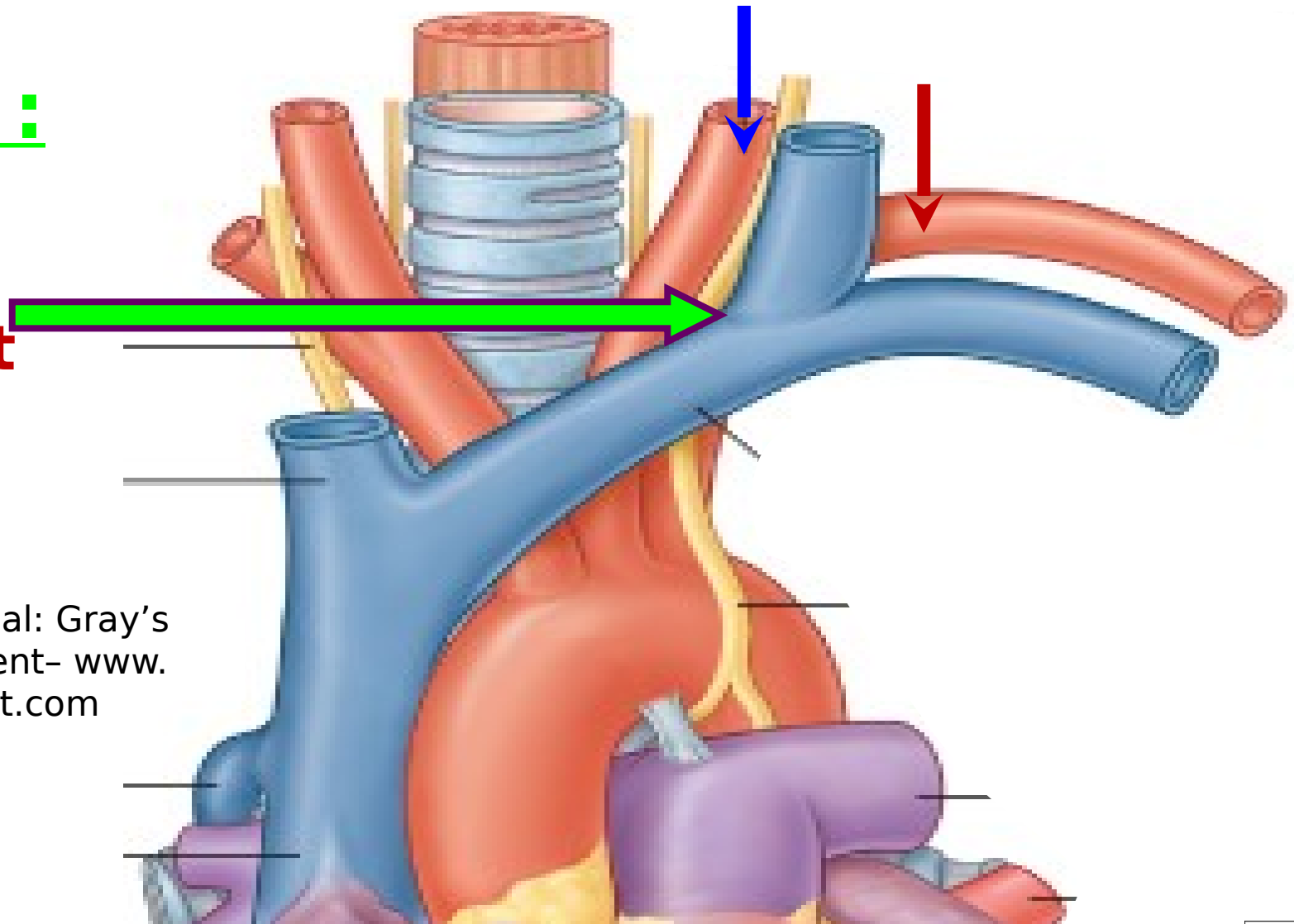


Course & relations of vagus nerve

- The left vagus :

Enters the thorax by
passing between **left**
common carotid & **left**
subclavian arteries

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Left vagus nerve

- Passes between **left common carotid** & **left subclavian** arteries
- Above root of lung □ descends on left side of **aortic arch**
- Behind the left bronchus *where it forms* **left posterior pulmonary plexus**
- Below root of lung □ descends **in front of esophagus** *where it forms* **esophageal plexus**
- Passes through **esophageal opening** in **diaphragm** □ ant. to the stomach, *therefore called* **anterior gastric nerve**



.Left subclavian A

LEFT VAGUS

**Left common
Carotid A.**

Arch of aorta

**Lt Post. Pulmonary
plexus**

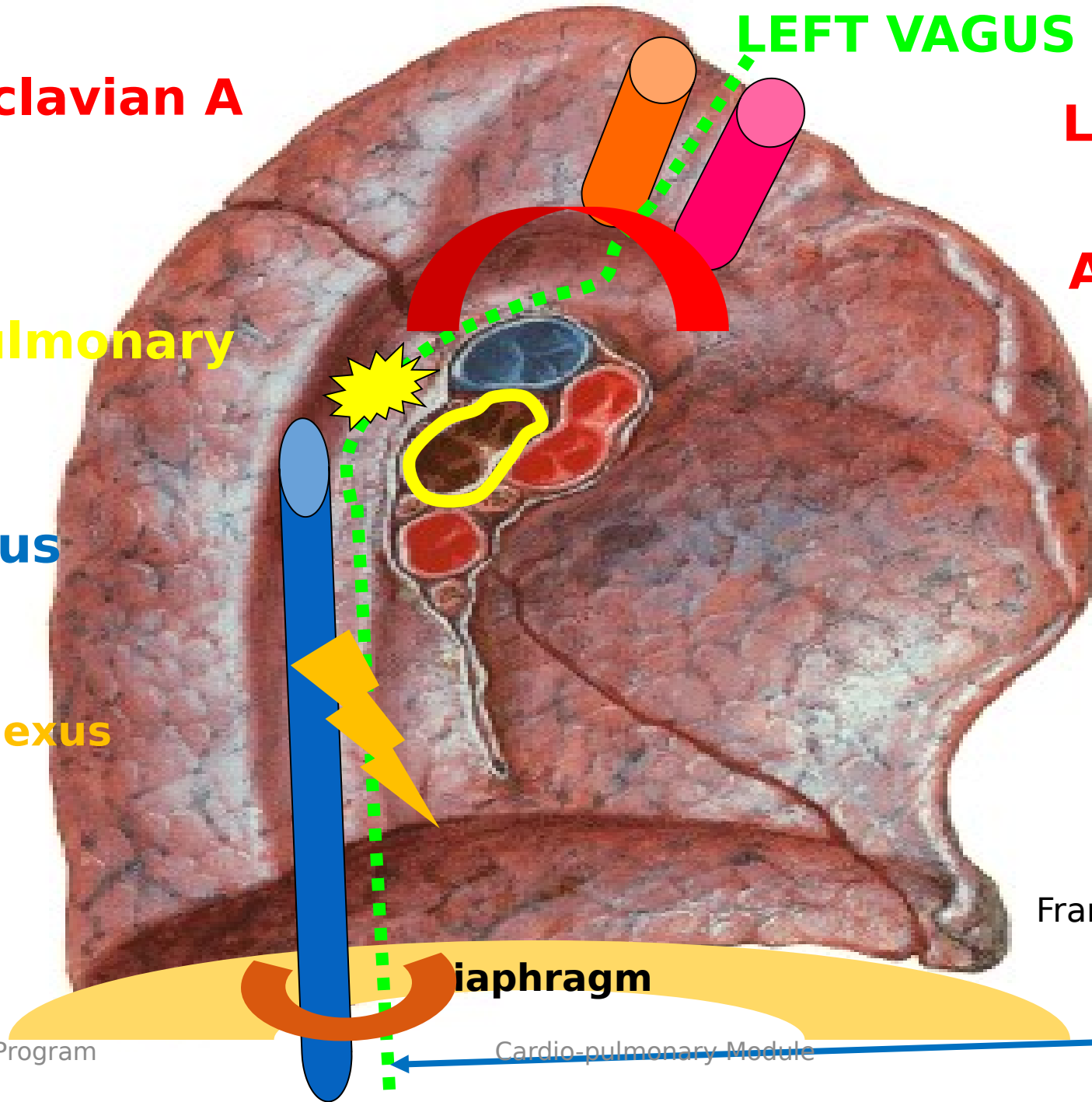
Esophagus

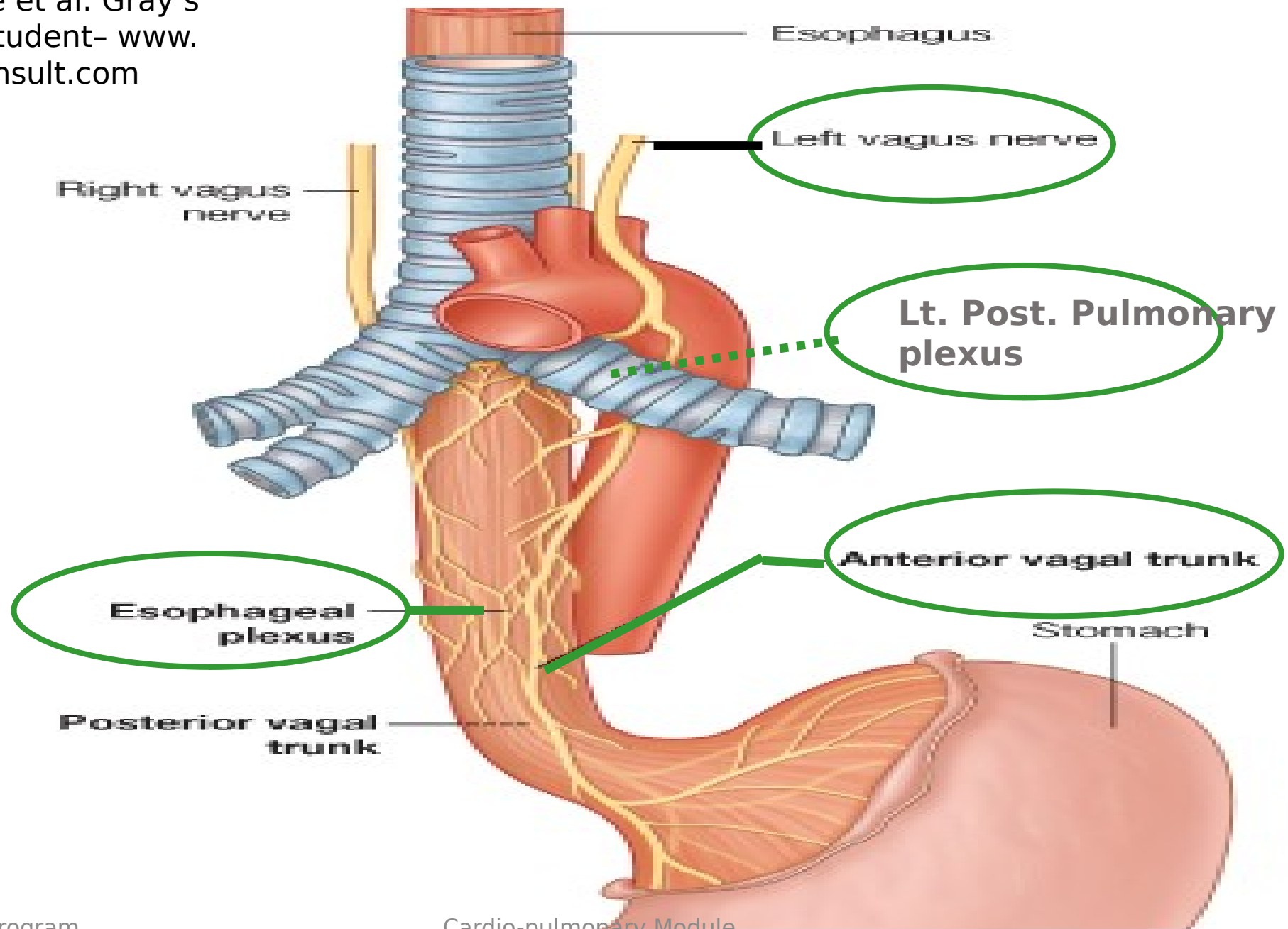
Left bronchus

Esophageal plexus

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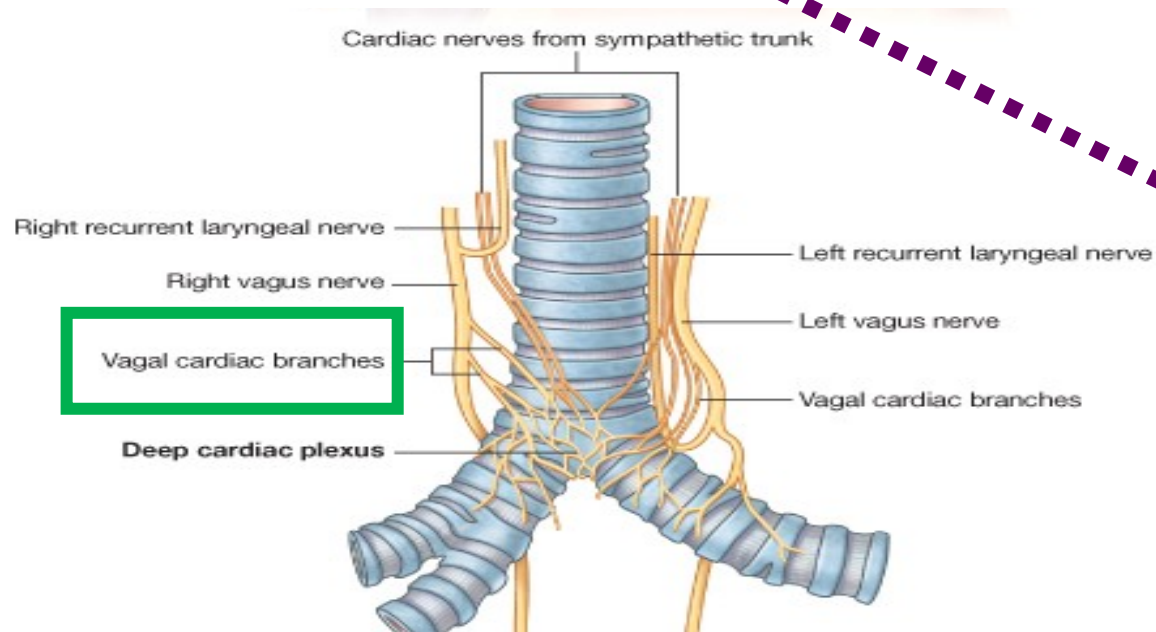
Diaphragm





Branches of the vagi in the thorax

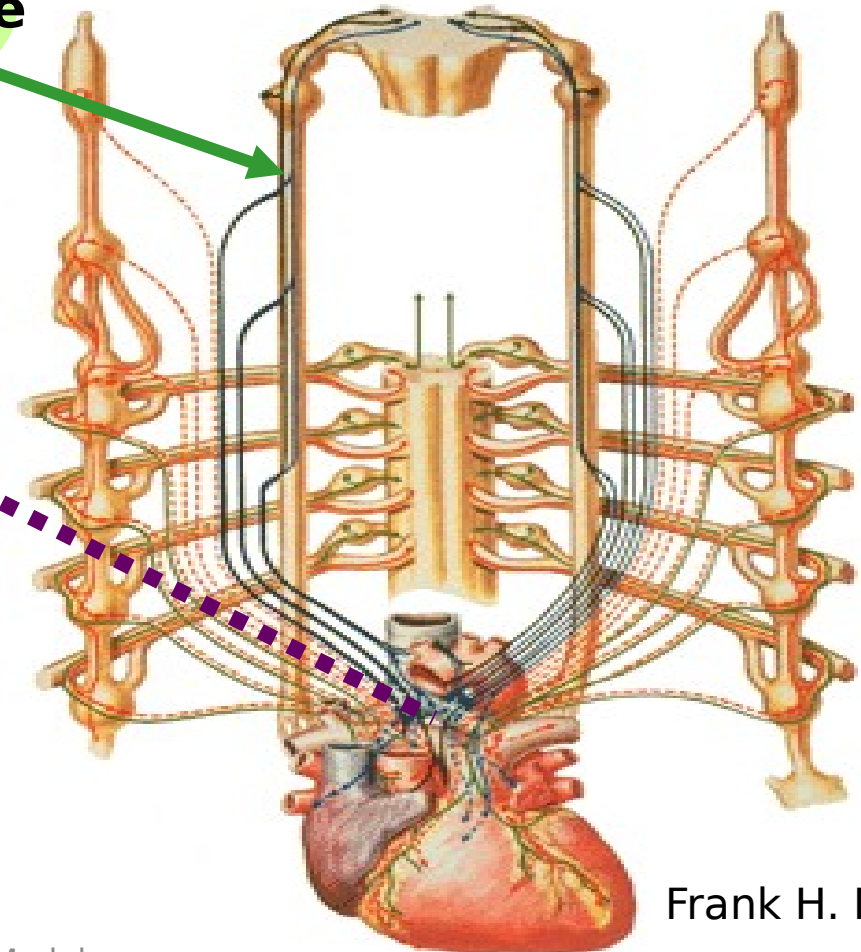
1. Cardiac branches ☐ cardiac plexus



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Innervation of Heart Schema

Vagus nerve

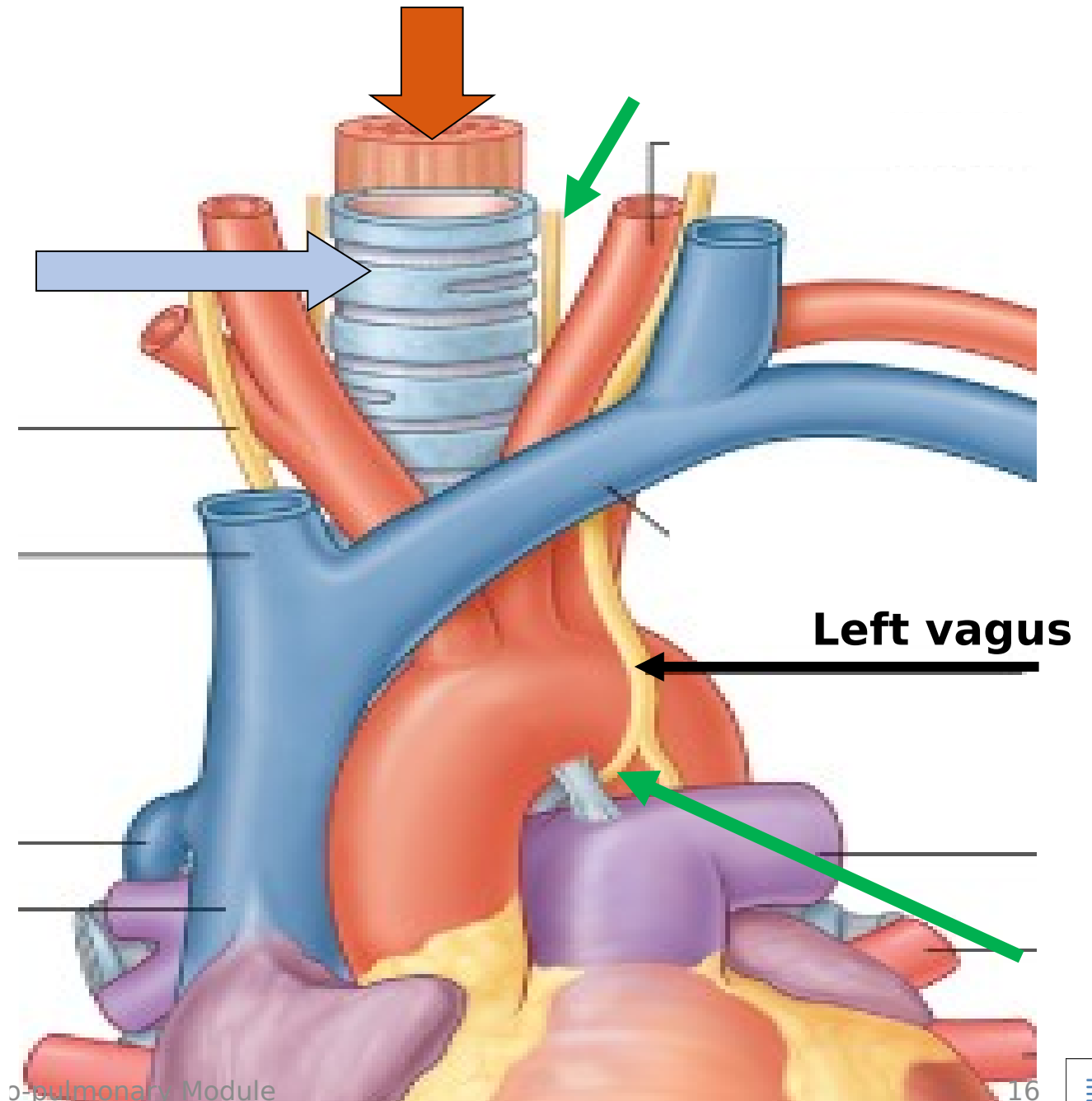


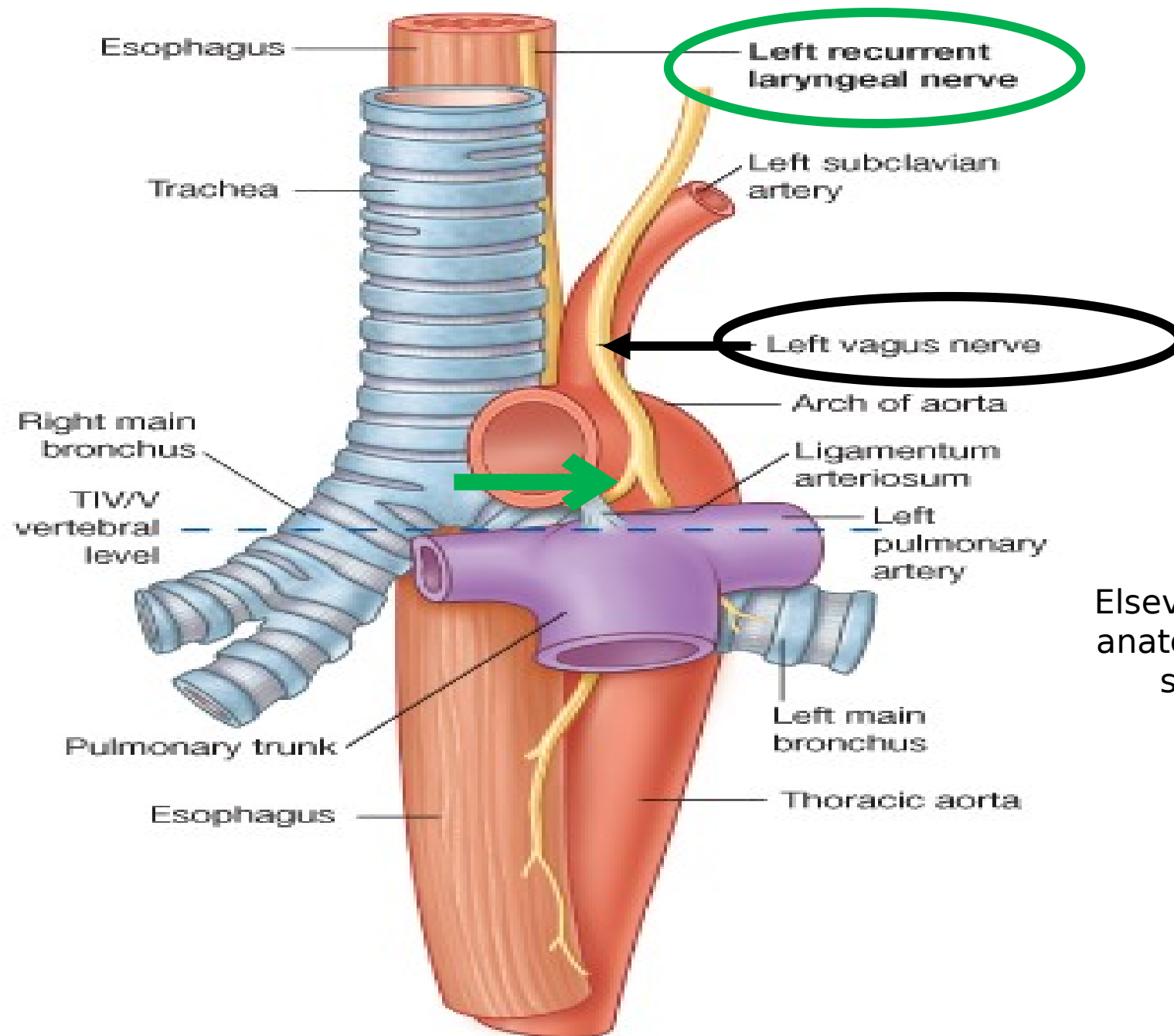
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2. Left recurrent laryngeal nerve
arises from left
vagus in superior
mediastinum as it
crosses arch of
aorta. It curves
below aortic arch
& ascends in
groove between
trachea &
oesophagus

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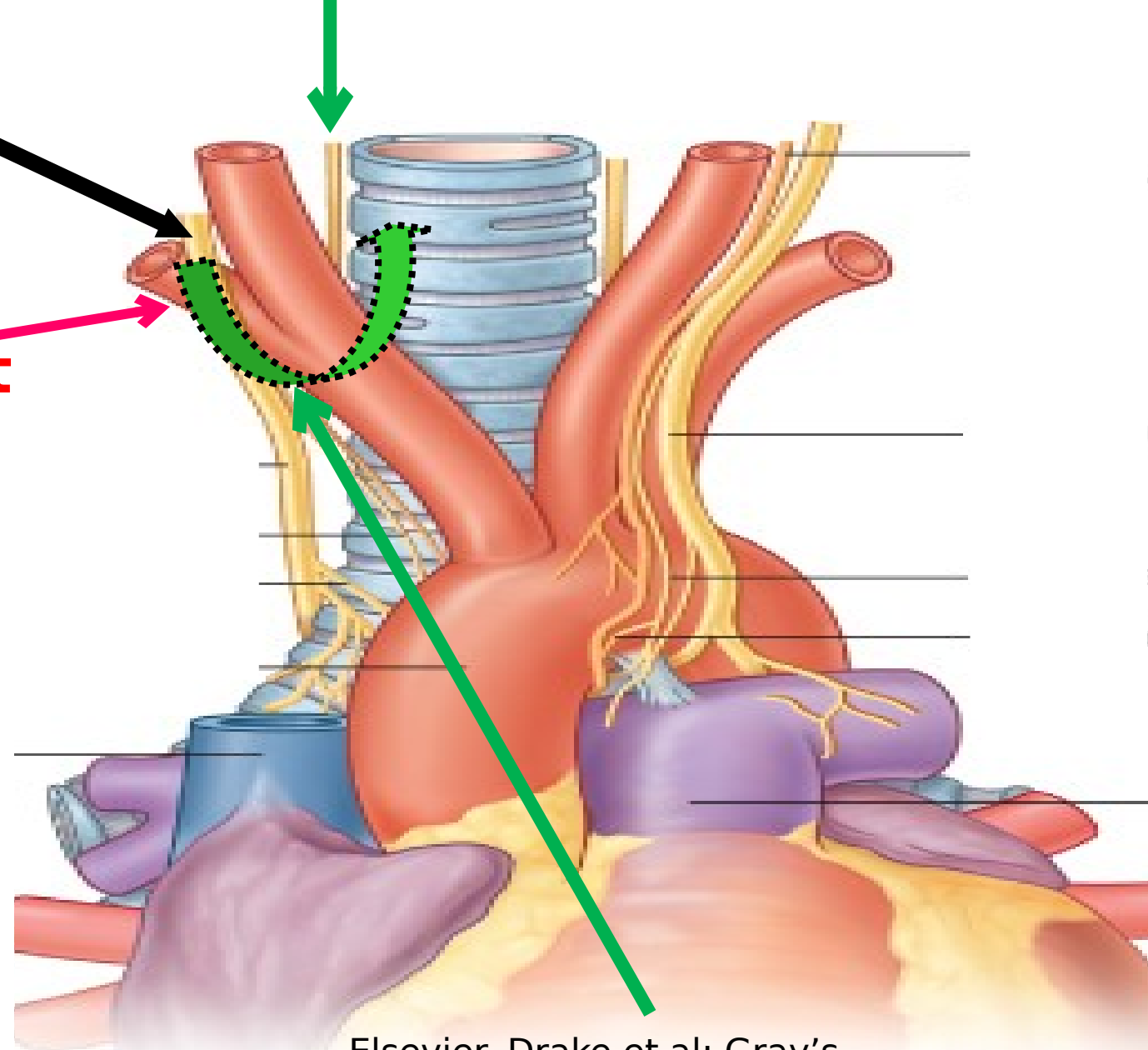
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N.B. Right recurrent laryngeal nerve □ from right vagus in the root of the neck.

It curves round the **right subclavian artery**

3. **Pulmonary plexus** (see before)

4. **Esophageal plexus** (see before)



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Lecture Quiz



Which statement correctly describes the left vagus nerve:

- A. It is separated from the trachea by left common carotid artery.**
- B. It passes anterior to the hilum of left lung.**
- C. It passes posterior to the arch of aorta.**
- D. It does not supply the oesophagus.**



Lecture Quiz **Answer**



Which statement correctly describes the left vagus nerve:

- A. It is separated from the trachea by left common carotid artery.**
- B. It passes anterior to the hilum of left lung.**
- C. It passes posterior to the arch of aorta.**
- D. It does not supply the oesophagus.**

THE THORACIC PART OF THE SYMPATHETIC TRUNK

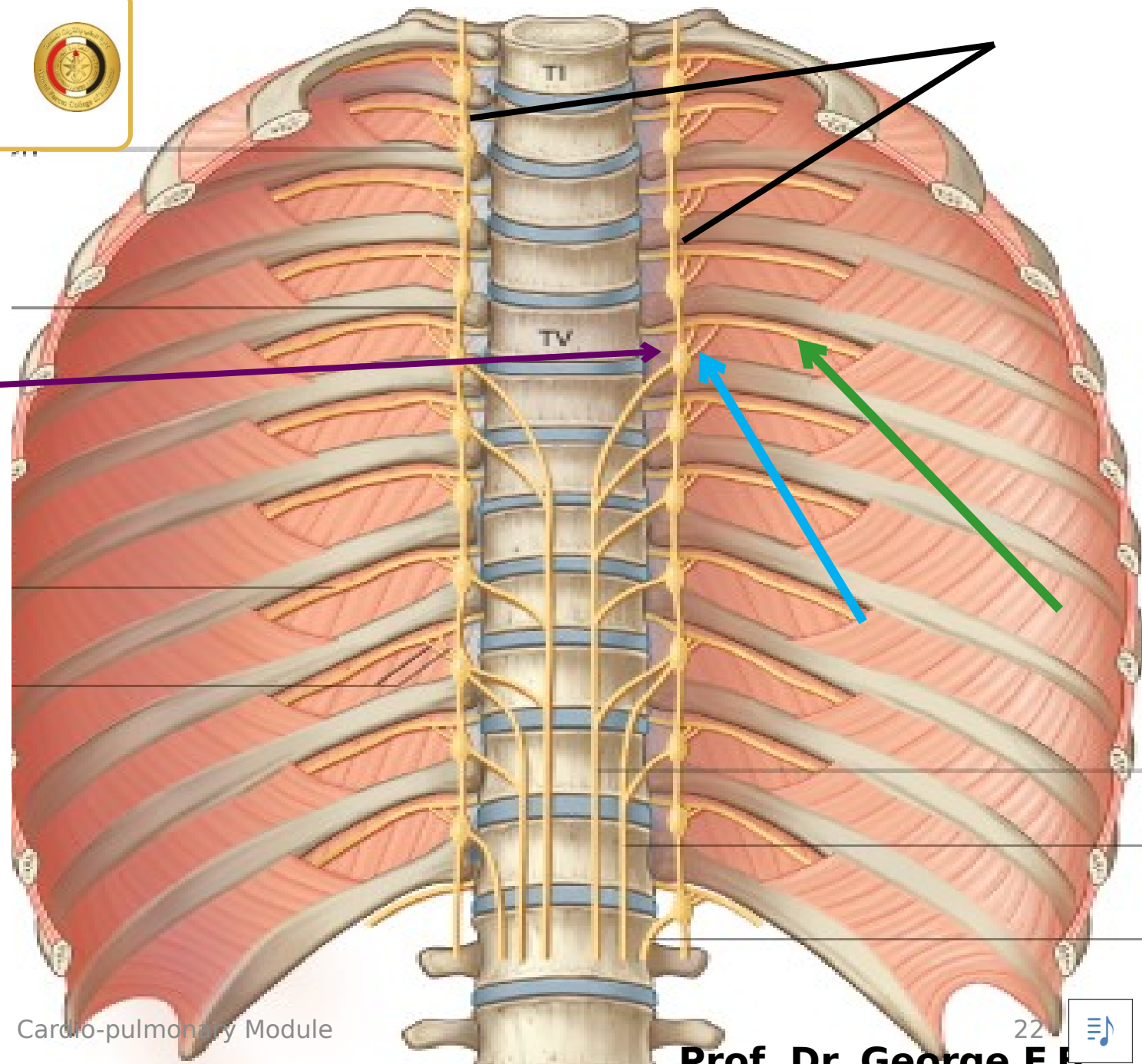


Sympathetic chain or trunk



- Consists of 2 parallel cords having 11 or 12 pairs of **ganglia**
- Each ganglion is connected to adjacent **thoracic spinal nerve** by **white & gray rami communicantes**

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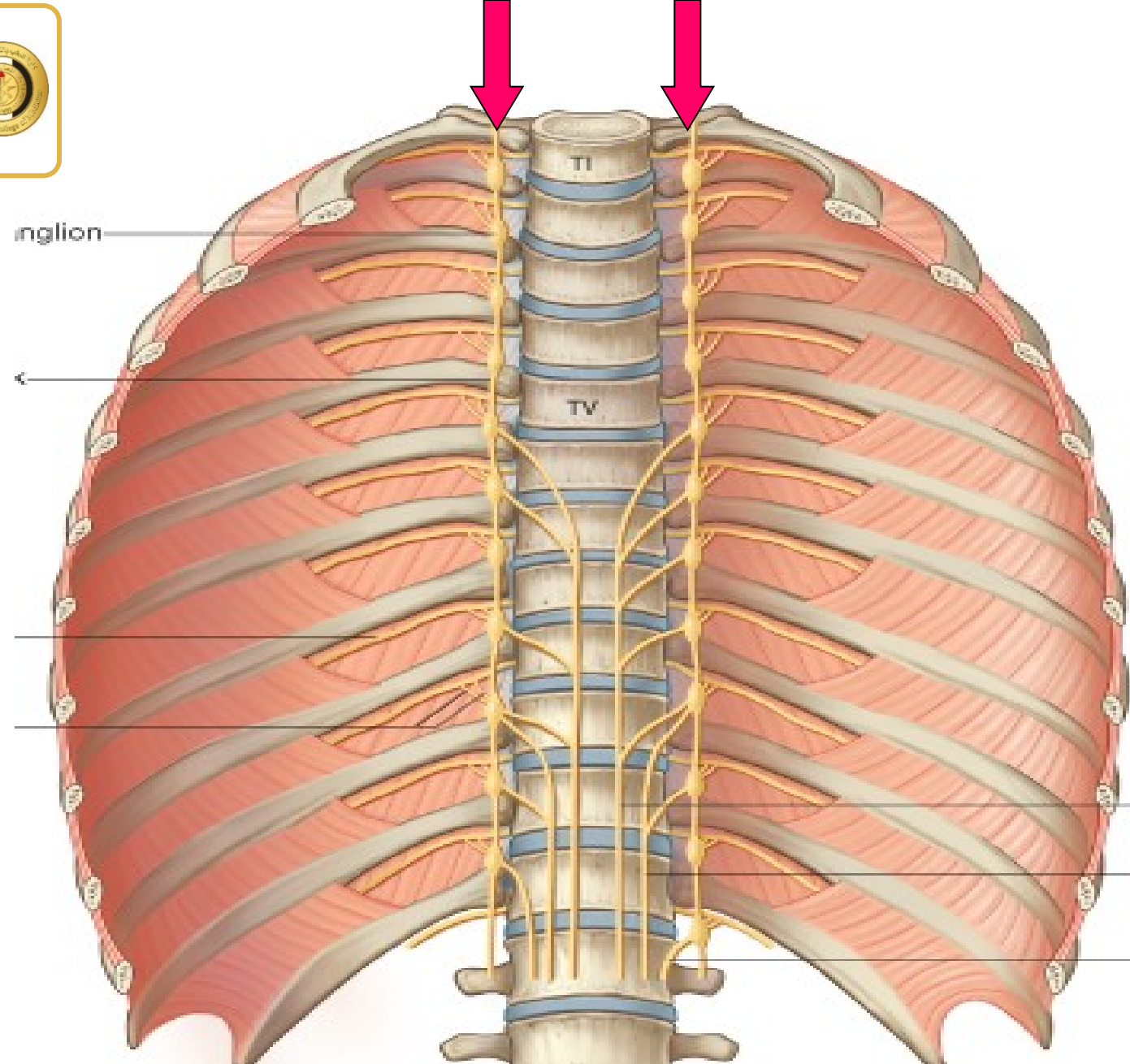


Sympathetic chain or trunk



- **Each sympathetic chain enters the thorax by crossing in front of the neck of 1st rib**

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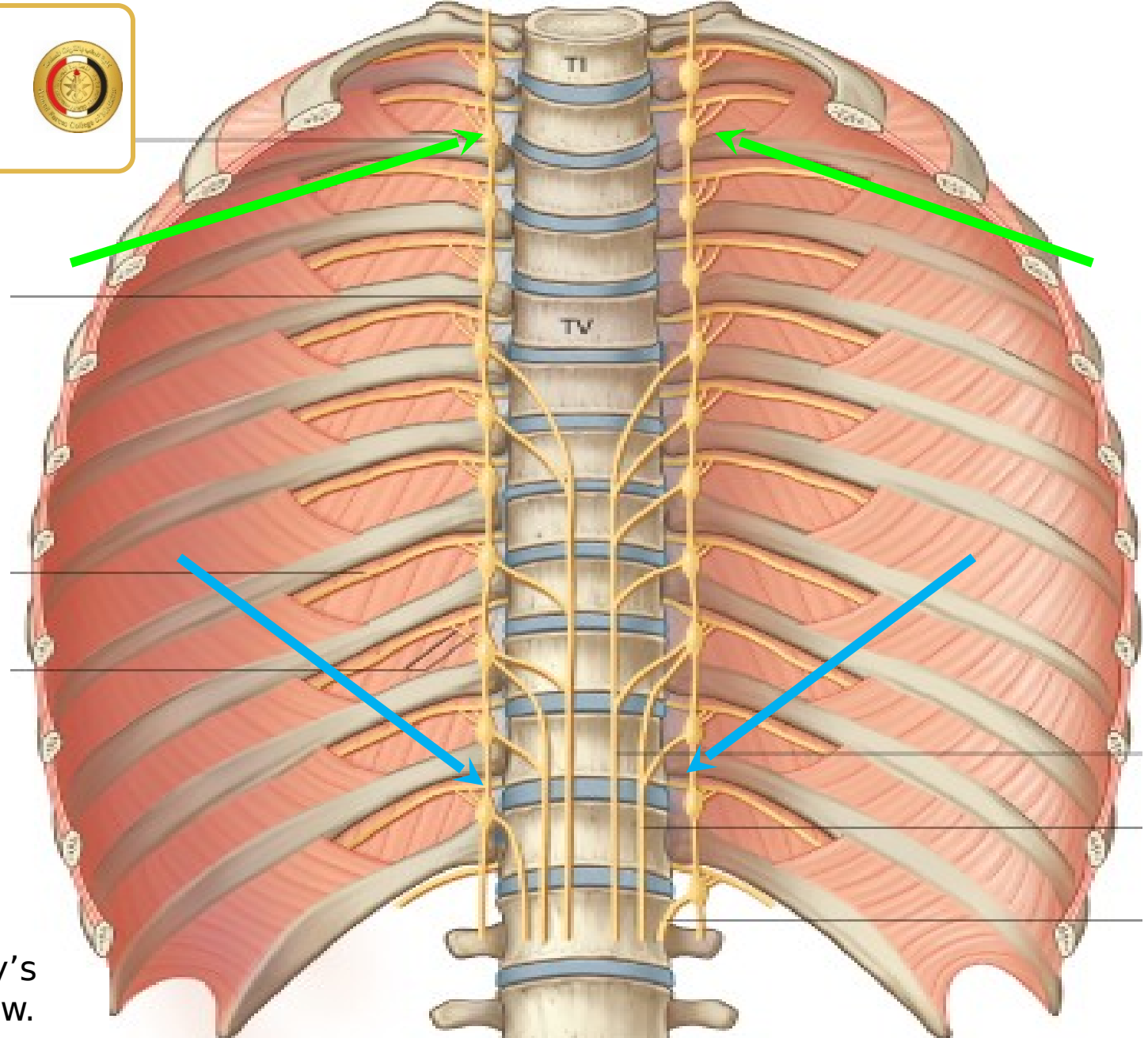
Sympathetic chain or trunk



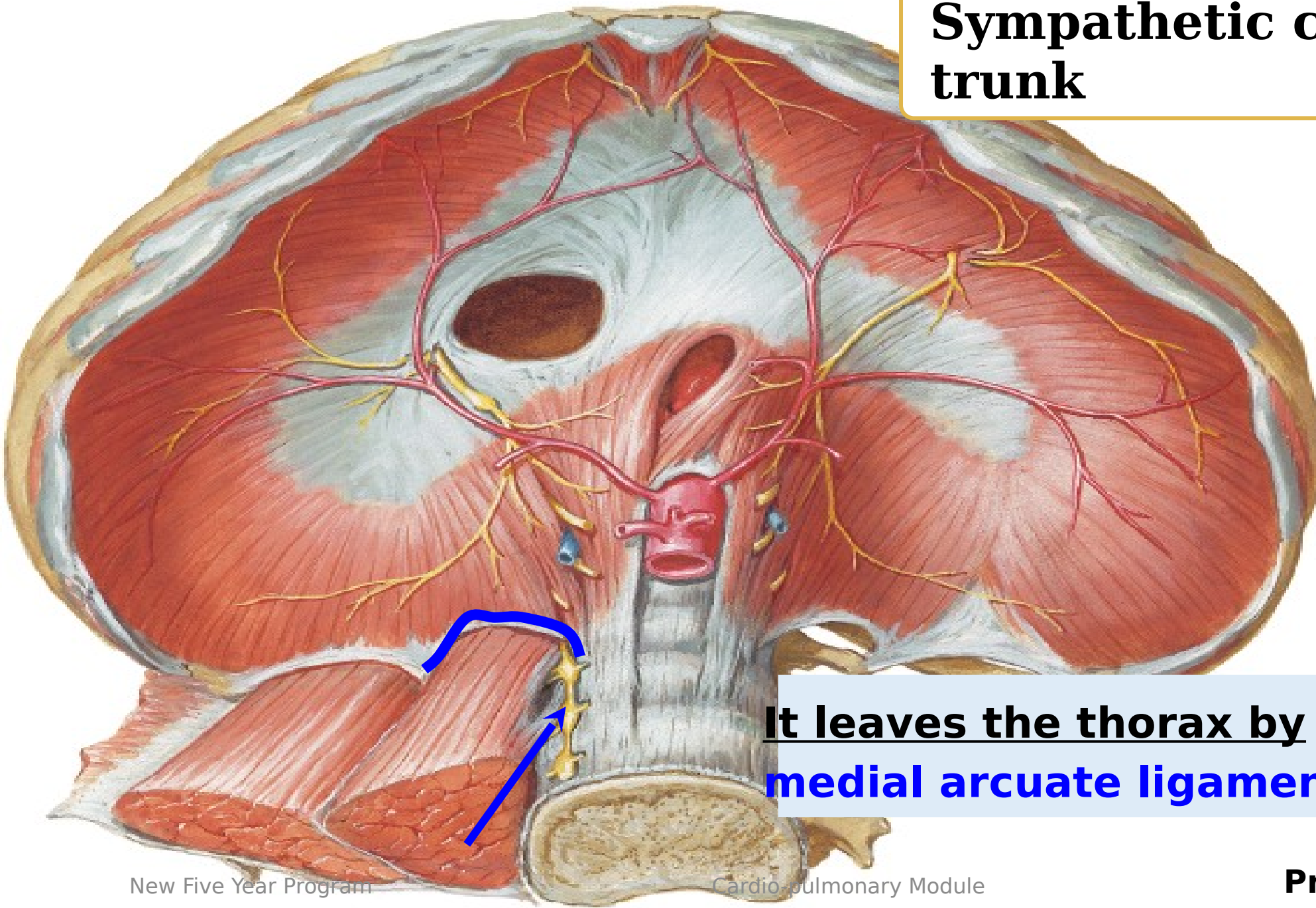
•Course & relations:

- 1) In upper part of thorax, they descend in front of the necks of ribs
- 2) In the lower part of the thorax, they descend on sides of bodies of vertebrae

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Sympathetic chain or trunk



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**It leaves the thorax by passing behind
medial arcuate ligament of diaphragm**

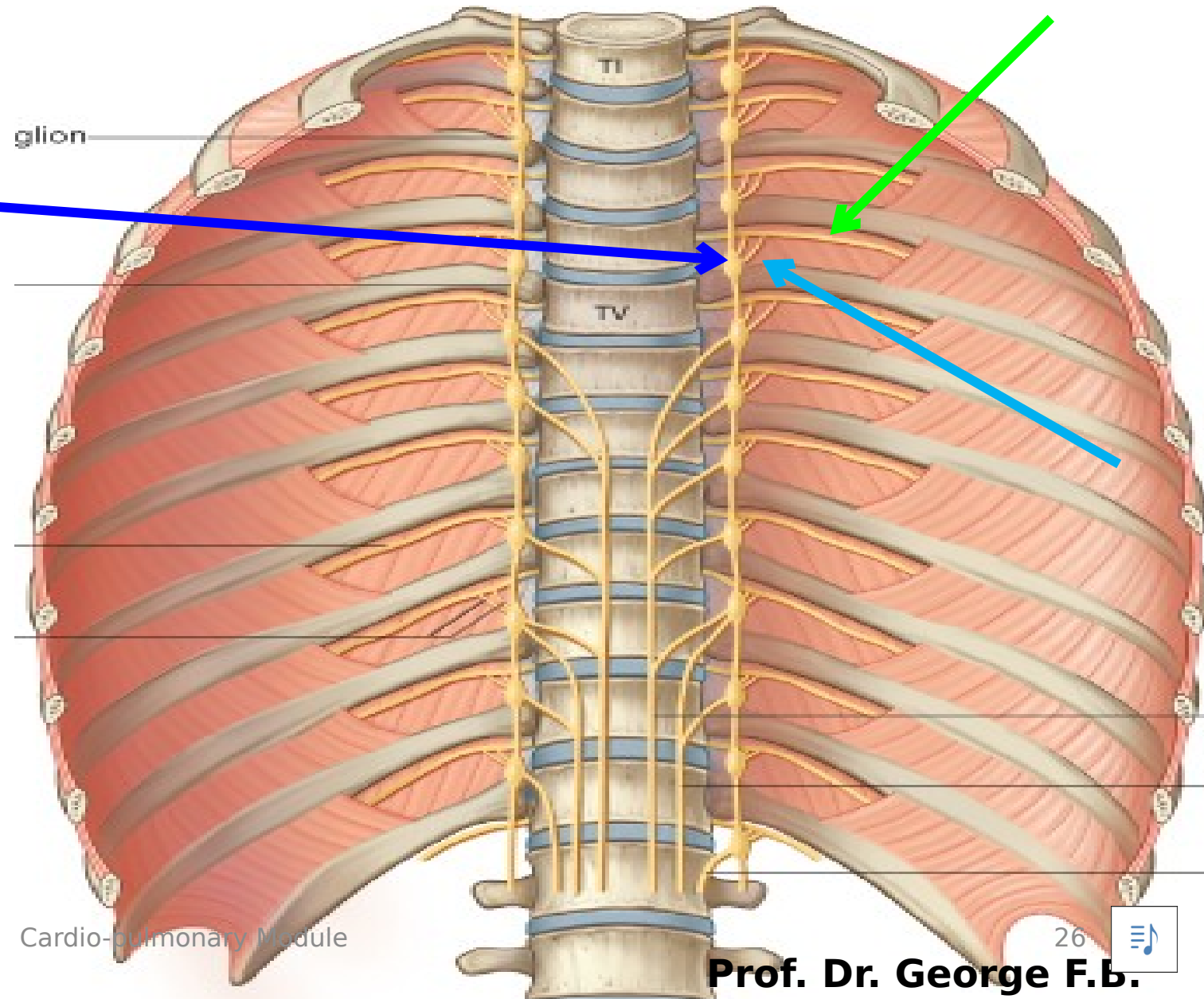


Branches



1. Lateral somatic communicating branches □ each ganglion is connected to the corresponding spinal nerve by white & gray rami communicantes

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Branches



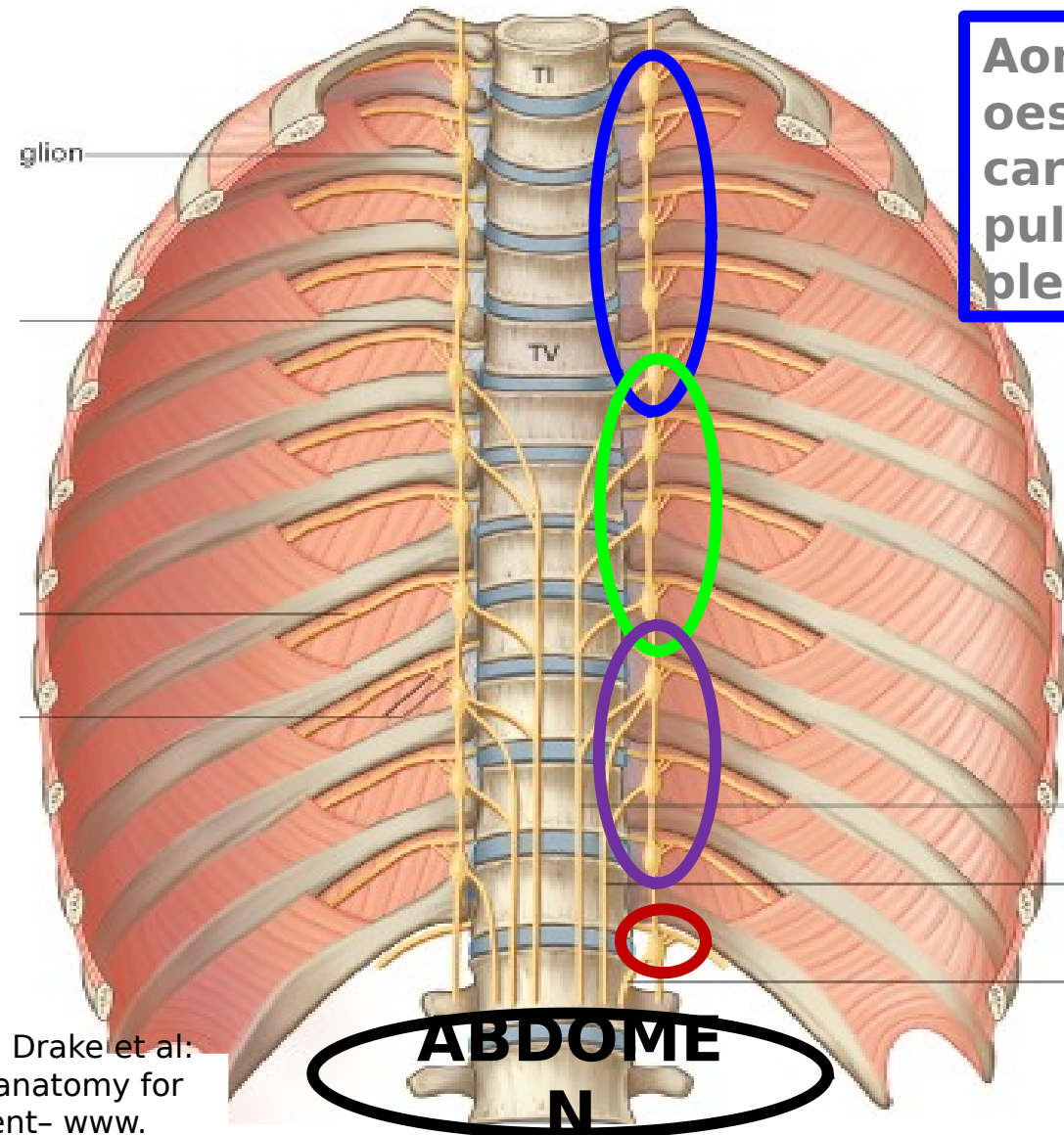
2. Medial visceral branches:

A. Upper 5 ganglia □ fibres to aortic & oesophageal, cardiac & pulmonary plexuses.

B. 5th - 9th ganglia □ greater splanchnic nerve □ abdomen.

C. 9th, 10th or, 10th, 11th ganglia □ lesser splanchnic nerve □ abdomen.

D. 12th ganglion □ least splanchnic nerve □ abdomen).



Aortic, oesophageal, cardiac & pulmonary plexuses

Greater splanchnic nerve

Lesser splanchnic nerve

Least splanchnic nerve

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Cardio-pulmonary Module

Prof. Dr. George F. Hanna



Lecture Quiz



The greater splanchnic N. is formed of branches from:

- A. 4th to 8th thoracic sympathetic ganglia.**
- B. 5th to 9th thoracic sympathetic ganglia.**
- C. 3rd to 7th thoracic sympathetic ganglia.**
- D. 6th to 10th thoracic sympathetic ganglia.**
- E. None of the above.**



Lecture Quiz **Answer**



The greater splanchnic N. is formed of branches from:

- A. 4th to 8th thoracic sympathetic ganglia.**
- B. 5th to 9th thoracic sympathetic ganglia.**
- C. 3rd to 7th thoracic sympathetic ganglia.**
- D. 6th to 10th thoracic sympathetic ganglia.**
- E. None of the above.**



AUTONOMIC PLEXUSES IN THE THORAX



Autonomic plexuses



1. Cardiac plexus -----
 - Superficial cardiac plexus
 - Deep cardiac plexus
2. Pulmonary plexus -----
 - Anterior pulmonary plexus
 - Posterior pulmonary plexus
3. Coronary plexus

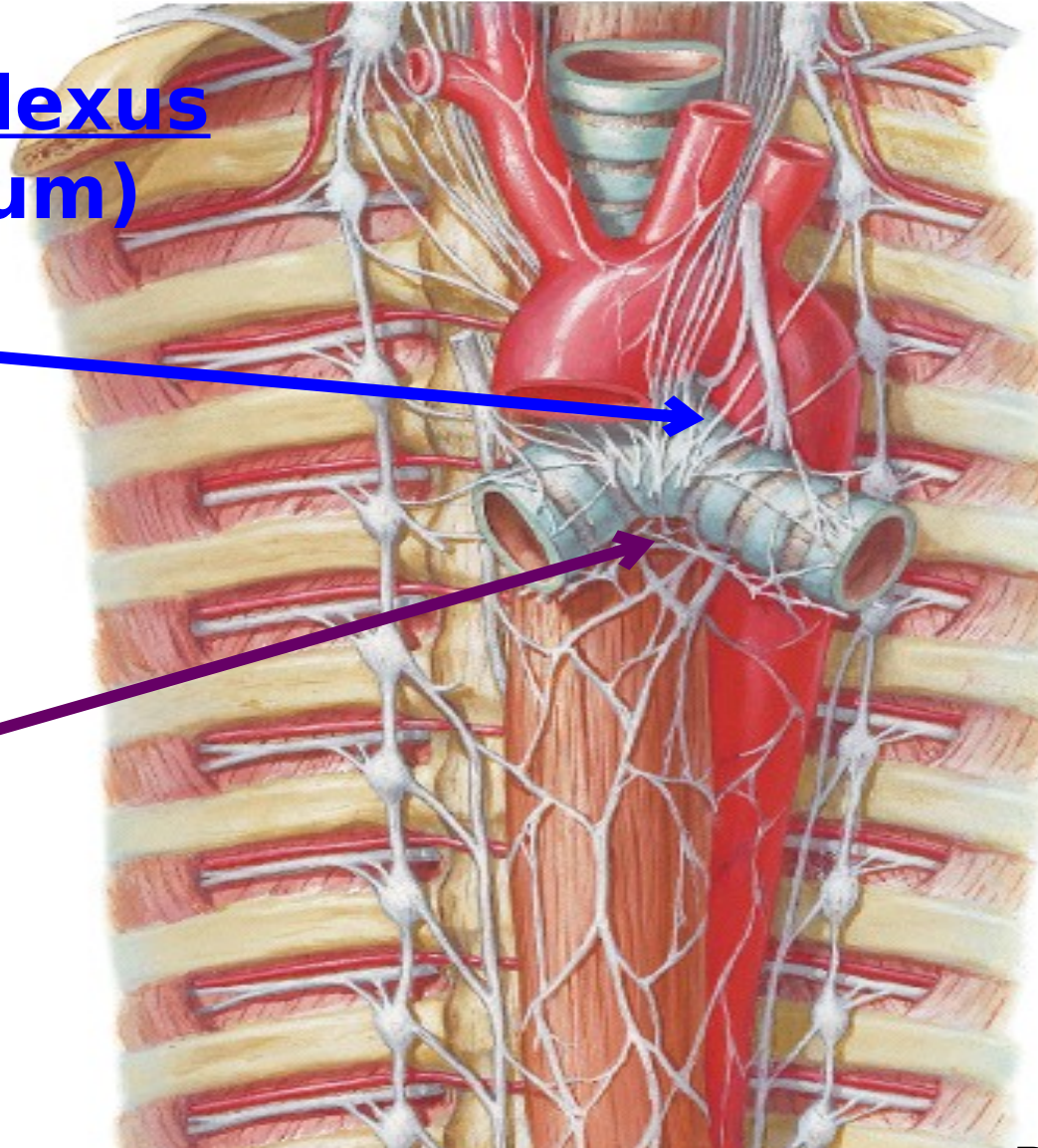


1. Cardiac plexuses



**Superficial cardiac plexus
in front of ligamentum
(arteriosum**

**Deep cardiac plexus
in front of tracheal)
(bifurcation**



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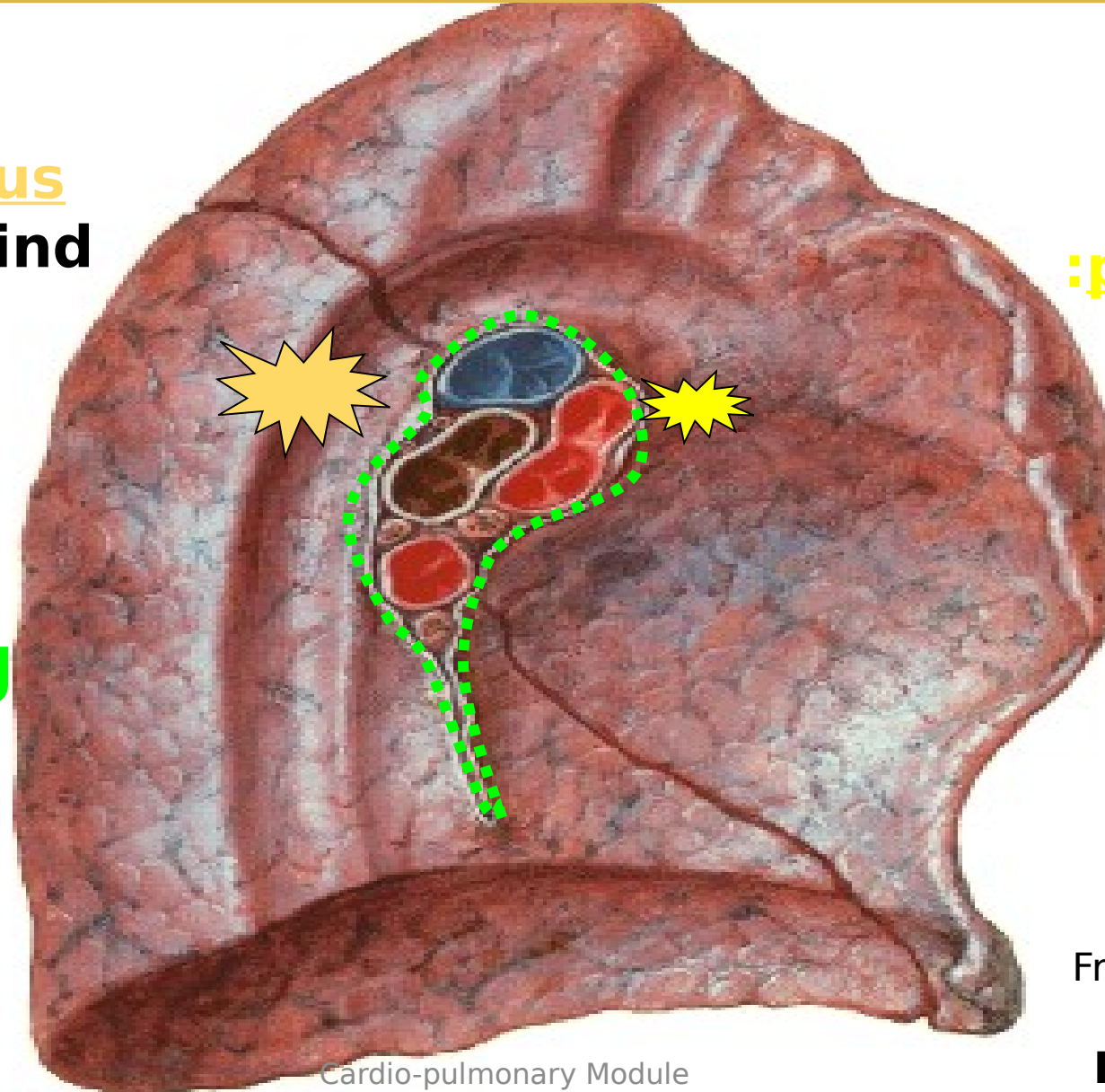


2. Pulmonary plexuses



Posterior
:pulmonary plexus
Larger & lies behind
root of lung

Root of lung



Anterior
:pulmonary plexus
Smaller & lies in
front
of root of lung

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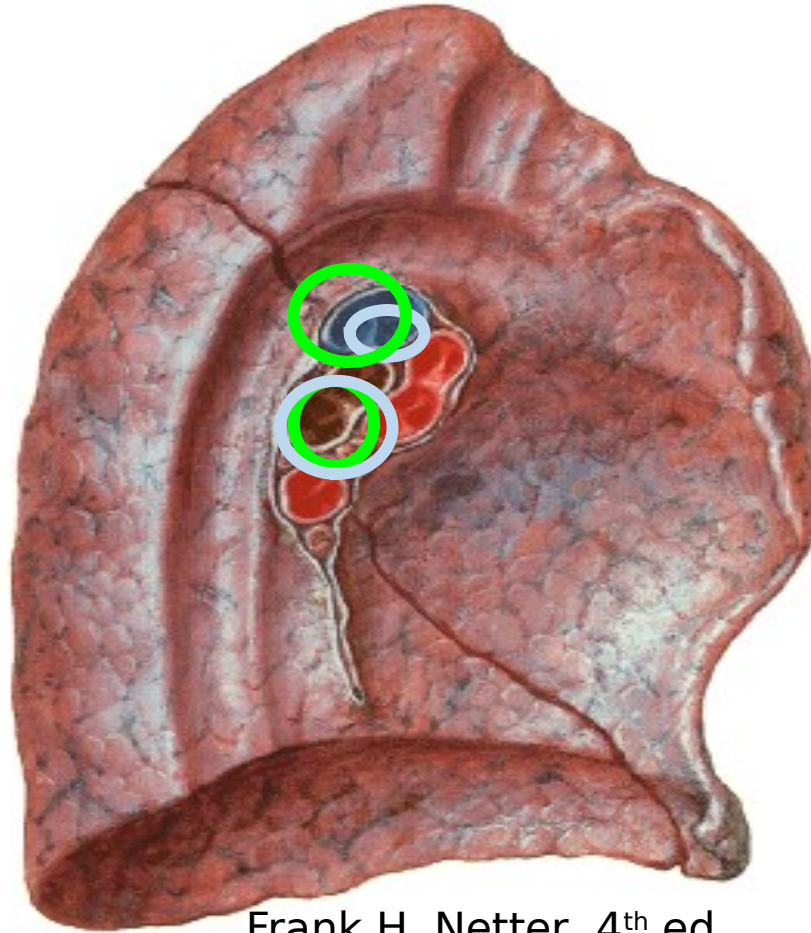


Distribution of pulmonary plexus



The plexus forms a network of fibers around the bronchial tree & pulmonary vessel

Vagal fibers □
bronchoconstrictor, secretory to glands & vasodilators



Sympathetic fibers □
bronchodilators & vasoconstrictors

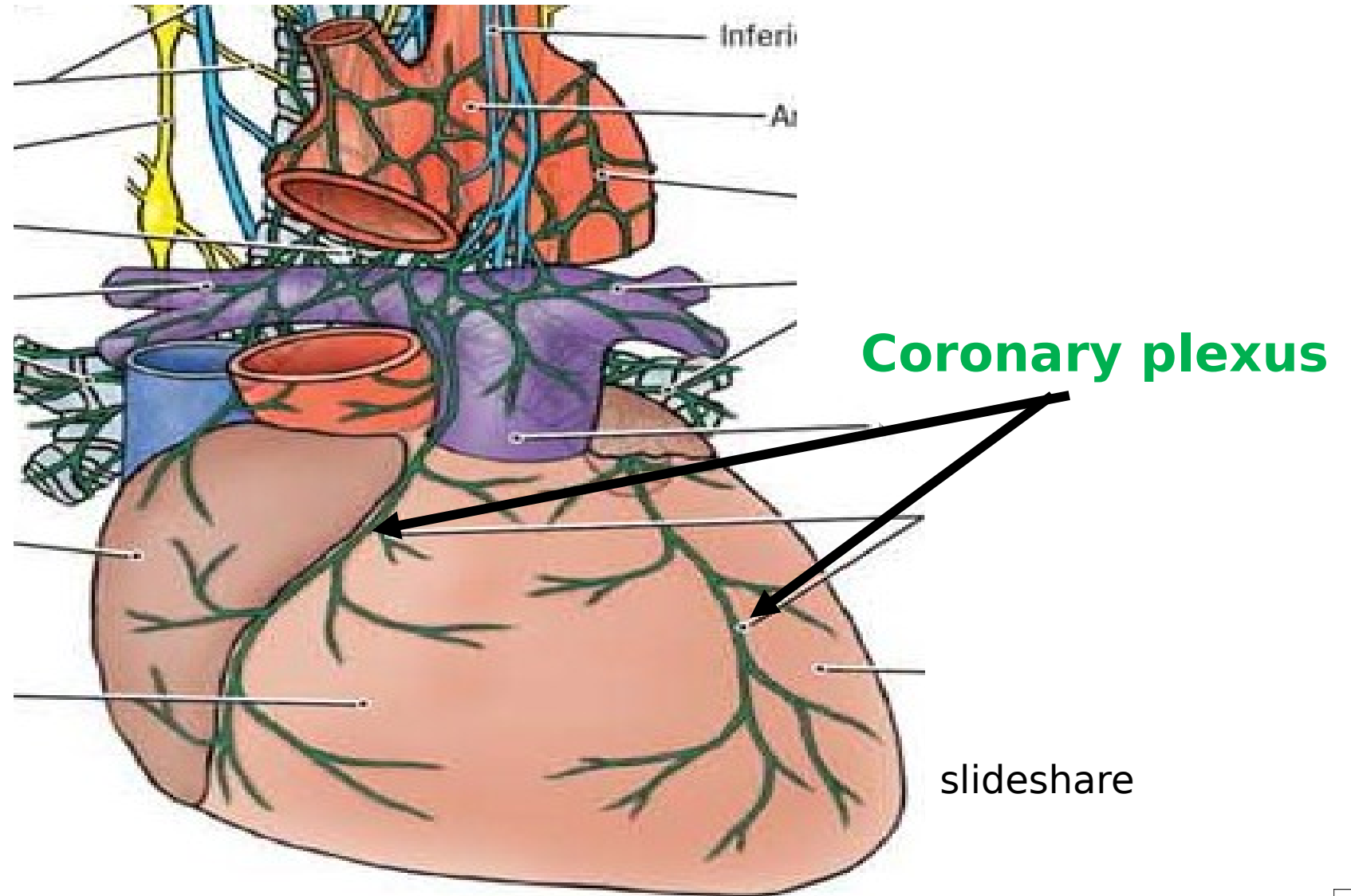
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3. Coronary plexus



Autonomic plexuses accompanying the coronary arteries and their branches. They are formed by branches of the cardiac plexus

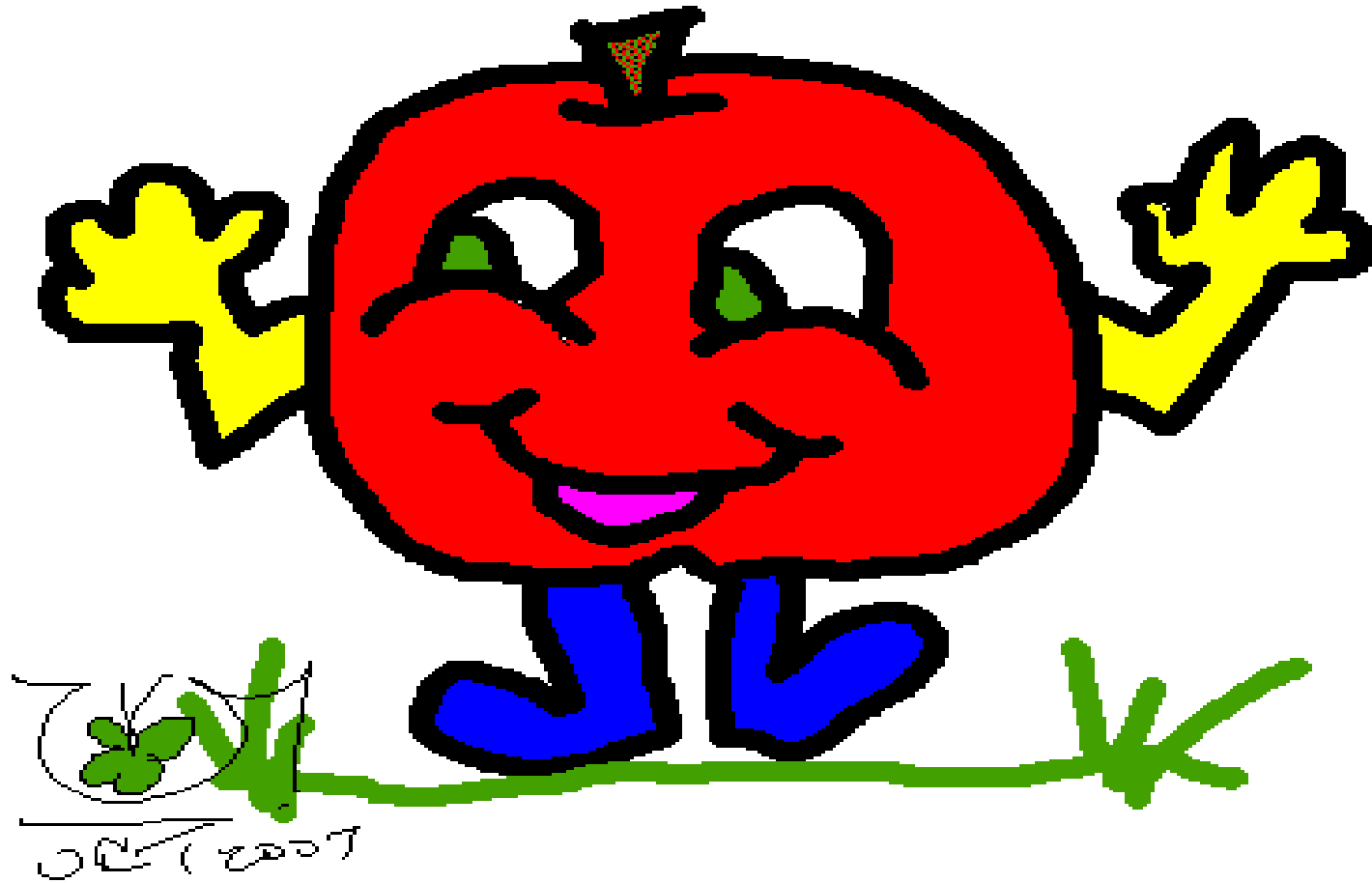


SUGGESTED TEXTBOOKS



Snell, Clinical Anatomy, 7th edition, p. 88, 99-100.





THANK YOU

